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10/042,929	10/18/2001	Janet Newman	10342-0010-999	4507

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EXAMINER	
SONG, HOON K	
ART UNIT	PAPER NUMBER
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/042,929	Applicant(s) NEWMAN ET AL.	
	Examiner Hoon K Song	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 8-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892) ✓
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

Claims 1, 11, 25 and 34 are objected to because of the following informalities:

the phrase "suitable" renders the claim(s) indefinite. How much is defined by suitable state of the crystalline material?

"Can be identified" in line 12 should be changed to "is identified"

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 11-16, 19-20 and 34 rejected under 35 U.S.C. 102(b) as being anticipated by Tatsumi et al. (US 4634490).

Tatsumi teaches an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment, comprising:

a crystal growth incubator (4) having opposing first and second sides;

an x-ray system, comprising:

an x-ray source (1) disposed adjacent to the first side of the crystal growth incubator, where the x-ray source is configured to irradiate single crystal grown in the crystal growing incubator; and

an x-ray detector (11) disposed adjacent to the second side of the crystal growth incubator, where the x-ray detector is configured to detect the presence of diffracted X-rays from crystalline material grown in said crystal growing incubator; and

such that in use, crystalline material grown in said incubator can be identified and screened for suitability by said x-ray system (column 4 line 8+) thereby, facilitating the increased reproducibility of successful crystal growth experiments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4 and 35 are rejected under 35 U. S.C. 103(a) as being unpatentable over Tatsumi el al. (U.S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Fink el al. (U. S. Patent No. 5,3 59,640).

Tatsumi el al. disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment comprising a crystal growth incubator (4).

However, Tatsumi et al. did riot teach that the apparatus further comprising an imaging system disposed adjacent to the crystal incubator.

Fink el al. disclosed a micro-diffractometer that comprises an optical imaging system (LS and KA) for aligning the x-ray with a micro-sized sample. It is further taught

that aligning the x-ray with the sample is a difficult and time-consuming process that requires trial and error due to the invisibility of the x-rays (column 1, lines 31-37).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an optical imaging system with the apparatus, since a person would be motivated to align the x-ray with the crystal by optical means prior to irradiating in order to speed up the alignment process.

Claims 5-6, 32-33 and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tatsumi el al. (U. S. Patent No. 4,634,490) as applied to claim I above, and further in view of Stettner et al. (U. S. Patent No. 5,629,524).

Tatsumi et al. disclosed an apparatus and method for detecting the presence of crystalline material In its in-situ growth environment, comprising an x-ray detector (It) disposed adjacent to the second side of the crystal growth incubator, where the x-ray detector is configured to detect the presence of diffracted Laue spots from the single crystal grown in the crystal growing incubator.

However, Tatsumi et al. did not teach that the x-ray detector is a phosphor plate imaging system.

Stettner el al. disclosed a real-time phosphor plate (43) imaging system (column 1, lines 45-60) for use with x-ray crystallography. This image system provides high sensitivity (phosphor plate) and a rapid readout (CCD).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a real-time phosphor plate imaging system for detecting diffracted x-rays, since a person would be motivated to obtain a result in real time.

Claim 8 is rejected under '15 U.S.C. 103(a) as being unpatentable over Tatsumi el al. (U. S. Patent No. 4,634,490) as applied to claim I above, and further in view of Cullity.

Tatsumi el al. disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment, comprising: an x-ray source (1) disposed adjacent to the first side of the crystal growth incubator, where the x-ray source is configured to irradiate single crystal grown in the crystal growing incubator.

However, Tatsumi el al. did not teach that the x-ray source emits a monochromatic beam of x-rays consisting of CuKct radiation.

Cullity disclosed that CuKct radiation is generally the most useful among the characteristic radiations in x-ray diffraction.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ CuK(x as the radiation in x-ray diffraction, since a person would be motivated to employ a widely available characteristic radiation in x-ray diffraction in order to reduce cost.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tatsumi et al. (U. S. Patent No. 4,634,490) as applied to claim I above, and further in view of Dosho (U. S. Patent No. 6,285,736 131).

Tatsumi el al. disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment, comprising: an x-ray source (1) disposed adjacent to the first side of the crystal growth incubator, where the x-ray source is configured to irradiate single crystal grown in the crystal growing incubator.

However, Tatsumi el al. did not teach that the x-ray source emits an x-ray beam with a focus size of 200 microns or less.

Dosho disclosed a micro-diffraction apparatus that is capable of producing a beam spot size of 100 ~tm or less (column 7, lines 1-2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an x-ray beam with a beam spot size of 100 ~lrn or less, since a person would be motivated to avoid the possibility of collecting scattered x-rays from areas outside a micron-sized sample by matching the beam spot size with the size of the sample.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tatsumi el al. (U. S. Patent No. 4,634,490) as applied to claim 1 above, and further in view of Polichar el al. (U. S. Patent No. 6,205,199 B 1).

Tatsumi el al. disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Tatsumi et al. did not teach that the apparatus further comprising a transmitter that transmits information associated with the diffraction pattern to a remote location.

Polichar el al. disclosed an x-ray system that comprises a transmitter (modem, Ethernet) for transmitting data to remote locations for evaluation by experts who are not on site.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a transmitter for transmitting data to remote locations, since a person would be motivated to consult with experts at remote locations.

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tatsumi el al. (U. S. Patent No. 4,634,490) as applied to claim 16 above.

Tatsumi el al. disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Tatsumi el al. did not teach storing the location of the crystalline material.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to store the location of the crystalline material, since a person would be motivated to automate the alignment procedure by storing the location of the crystalline material in a computer and program the computer to calculate the positions of the x-ray source and x-ray detector based on the location of the crystalline material.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tatsumi el al. (U. S. Patent No. 4,634,490) as applied to claim 20 above.

Tatsumi et al. disclosed an apparatus and method for detecting the presence of crystalline material in its growth environment.

However, Tatsumi el al. did not teach growing the crystalline material by a method selected from a group consisting of a vapor diffusion method, a hang-drop method, a sitting drop method, a dialysis method, a microbatch method, and a gel crystal growth method.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform this method in any growth environment, since a person would be motivated to monitor the growth of a crystalline material in order perfect the growth process. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose from among the known methods based solely on design choice absent any showing of criticality. The lack of criticality is demonstrated by applicant's claiming of a plurality of methods.

Claim 22 is rejected under 35 U. S.C. 103(a) as being unpatentable over Tatsumi et al. (U. S. Patent No. 4,634,490) as applied to claims 1 above, and further in view of Arnowitz el al. (U. S. Patent No. 6,468,346 B2).

Tatsumi et al. disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Tatsumi et al. did not teach performing this method in space.

Arnowitz et al. disclosed that space-grown crystals are of higher crystallographic perfection than earth-grown crystals (column 2, lines 14-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform this method in space, since a person would be motivated to grow crystals with fewer defects that are suitable for use in either practical applications or crystallography.

Claims 23 and 24 are rejected under 3 5 U. S.C. 103(a) as being unpatentable over Tatsumi el al. (U. S. Patent No. 4,634,490) as applied to claim 1 above.

Tatsumi el al. disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Tatsumi et al. did not teach that the method further comprising determining whether the crystalline material is a protein crystal or a salt crystal.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine whether the crystalline material is a protein crystal or a salt crystal, since a person in the art would be able to make that determination given the x-ray diffraction pattern.

Claim 4 is rejected under 35 U.S.C. 103(a) as being, unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim I above, and further in view of Fink el al. (U. S. Patent No. 5,359,640).

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment comprising a crystal growth incubator (6).

However, Murayama did not teach that the apparatus further comprising an imaging system disposed adjacent to the crystal incubator.

Fink el al. disclosed a micro-diffractometer that comprises an optical imaging system (LS and KA) for aligning the x-ray with a micro-sized sample. It is further taught that aligning the x-ray with the sample is a difficult and time-consuming process that requires trial and error due to the invisibility of the x-rays (column 1, lines 3 1-37).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide an optical imaging system with the apparatus, since a

person would be motivated to align the x-ray with the crystal by optical means prior to irradiating in order to speed up the alignment process.

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (U, S. Patent No. 5,046,077) as applied to claim I above, and further in view of Stettner el al. (U. S. Patent No. 5,629,524).

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment, comprising an x-ray detector (5) disposed adjacent to the second side of the crystal growth incubator, where the x-ray detector is configured to detect the presence of diffracted Laue spots from the single crystal grown in the crystal growing incubator.

However, Tatsumi et al. did not teach that the x-ray detector is a phosphor plate imaging system.

Stettner el al. disclosed a real-time phosphor plate imaging system (column 1, lines 4560) for use with x-ray crystallography. This phosphor plate image system provides high sensitivity (phosphor plate) and a rapid readout (CCD).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a real-time phosphor plate imaging system for detecting diffracted x-rays, since a person would be motivated to obtain a result in real time.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim I above, and further in view of Cullity.

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment, comprising- an x-ray source (1) disposed adjacent to the first side of the crystal growth incubator, where the x-ray source is configured to irradiate single crystal grown in the crystal growing incubator.

However, Murayama did not teach that the x-ray source emits a monochromatic beam of x-rays consisting of CuKcc radiation.

Cullity disclosed that CuKct radiation is generally the most useful among the characteristic radiations in x-ray diffraction.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ CuKa as the radiation in x-ray diffraction, since a person would be motivated to employ a widely available characteristic radiation in x-ray diffraction in order to reduce cost.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim I above, and further in view of Dosho (U. S. Patent No. 6,285,73 6 B 1).

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment, comprising- an x-ray source (1) disposed adjacent to the first side of the crystal growth incubator, where the x-ray source is configured to irradiate single crystal grown in the crystal growing incubator.

However, Murayama did not teach that the x-ray source emits an x-ray beam with a focus size of 200 microns or less.

Dosho disclosed a micro- diffraction apparatus that is capable of producing a beam spot size of 100 ~tm or less (column 7, lines 1-2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an x-ray beam with a beam spot size of 100 ~tm or less, since a person would be motivated to avoid the possibility of collecting scattered x-rays from areas outside a micron-sized sample by matching the beam spot size with the size of the sample.

Claim 10 is rejected under 35 U. S.C, 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim I above, and further in view of Polichar et al. (U. S. Patent No. 6,205,199 B 1).

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Murayama did not teach that the apparatus further comprising a transmitter that transmits information associated with the diffraction pattern to a remote location.

Polichar et al. disclosed an x-ray system that comprises a transmitter (modem, Ethernet) for transmitting data to remote locations for evaluation by experts who are not on site.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a transmitter for transmitting data to remote locations, since a person would be motivated to consult with experts at remote locations.

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim 16 above.

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Murayama did not teach storing the location of the crystalline material.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to store the location of the crystalline material, since a person would be motivated to automate the alignment procedure by storing the location of the crystalline material in a computer and program the computer to calculate the positions of the x-ray source and x-ray detector based on the location of the crystalline material.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim 20 above.

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Murayama did not teach growing the crystalline material by a method selected from a group consisting of a vapor diffusion method, a hang-drop method, a sitting drop method, a dialysis method, a microbatch method, and a gel crystal growth method.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform this method in any growth environment, since a person would be motivated to monitor the growth of a crystalline material in order perfect the growth process. Furthermore, it would have been obvious to a person of ordinary skill in

the art at the time the invention was made to choose from among the known methods based solely on design choice absent any showing of criticality. The lack of criticality is demonstrated by applicant's claiming of a plurality of methods.

Claim 22 is rejected under 35 U. S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim 1 above, and further in view of Arnowitz et al. (U. S. Patent No. 6,468,346 132).

Murayama disclosed an apparatus and method for detecting the presence of crystalline material in its in-situ growth environment.

However, Murayama did not teach performing this method in space. Arnowitz el al. disclosed that space-grown crystals are of higher crystallographic perfection than earth-grown crystals (column 2, lines 14-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform this method in space, since a person would be motivated to grow crystals with fewer defects that are suitable for use in either practical applications or crystallography.

However, Murayama did not teach that the method comprises the steps of storing the location of the crystal.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to store the location of the crystal, since a person would be motivated to automate the alignment procedure by storing the location of the crystal in a computer and program the computer to calculate the positions of the x-ray source and x-ray detector based on the location of the crystal.

Claim 28 is rejected under 3 5 U. S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim 25 above, and further in view of Fink el al. (U. S. Patent No. 5,3 59,640).

Murayama disclosed a method of screening for crystalline material in its in-situ growth environment.

However, Murayama did not teach re-positioning the crystalline material relative to the x-ray beam while the x-ray beam remains stationary.

Fink el al. disclosed an x-ray micro-diffractometer comprising an XYZ sample stage.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to re-position the crystalline material relative to a stationary x-ray beam, since a person would be motivated to study the surface morphology of the crystalline material while keeping the diffraction geometry constant.

Claim 29 is rejected under 3 5, U. S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim 25 above, and further in view of Arnowitz et al. (U. S. Patent No. 6,468,346 132).

Murayama disclosed a method of screening for crystalline material in its in-situ growth environment.

However, Murayama did not teach performing this method in space. Arnowitz et a/. disclosed that space-grown crystals are of higher crystallographic perfection than earth-grown crystals (column 2, lines 14-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform this method in space, since a person would be motivated to grow crystals with fewer defects that are suitable for use in either practical applications or crystallography.

Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (U. S. Patent No. 5,046,077) as applied to claim 25 above.

Murayama disclosed a method of screening for crystalline material in its in-situ growth environment.

However, Murayama did not teach determining whether the crystalline material is a protein crystal or a salt crystal.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine whether the crystalline material is a protein crystal or a salt crystal, since a person in the art would be able to make that determination given the x-ray diffraction pattern.

Response to Arguments

Applicant's arguments filed February 20, 2003 have been fully considered but they are not persuasive.

In response to applicant's argument that Tatsumi fails to teach initially determines whether crystalline material is present at all. However it is noted that the features upon which applicant relies (i.e., initially determines, present at all, before irradiating) are not recited in the rejected claim(s), thus Tatsumi teaches an x-ray detector which configured to detect the presence of diffracted x-ray from crystalline because it is presupposed that

there already exists crystalline material all the time. Furthermore one having ordinary skill in the art would be motivated to initially determines the presence or absence of crystalline material because it is well known in the art to easily figure out the presence of crystalline material by simply analyzing the detected diffracted x-ray at any time.

In response to applicant's argument that Tatsumi fails to teach detecting the presence of crystalline material. The examiner disagrees with that interpretation because it is presupposed that there is always crystalline material thus, Tatsumi clearly teaches that detecting the crystal in the two dimensional manner (column 3 line 47+).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon K Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 703-305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-4858 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hoon Song
June 1, 2003

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800